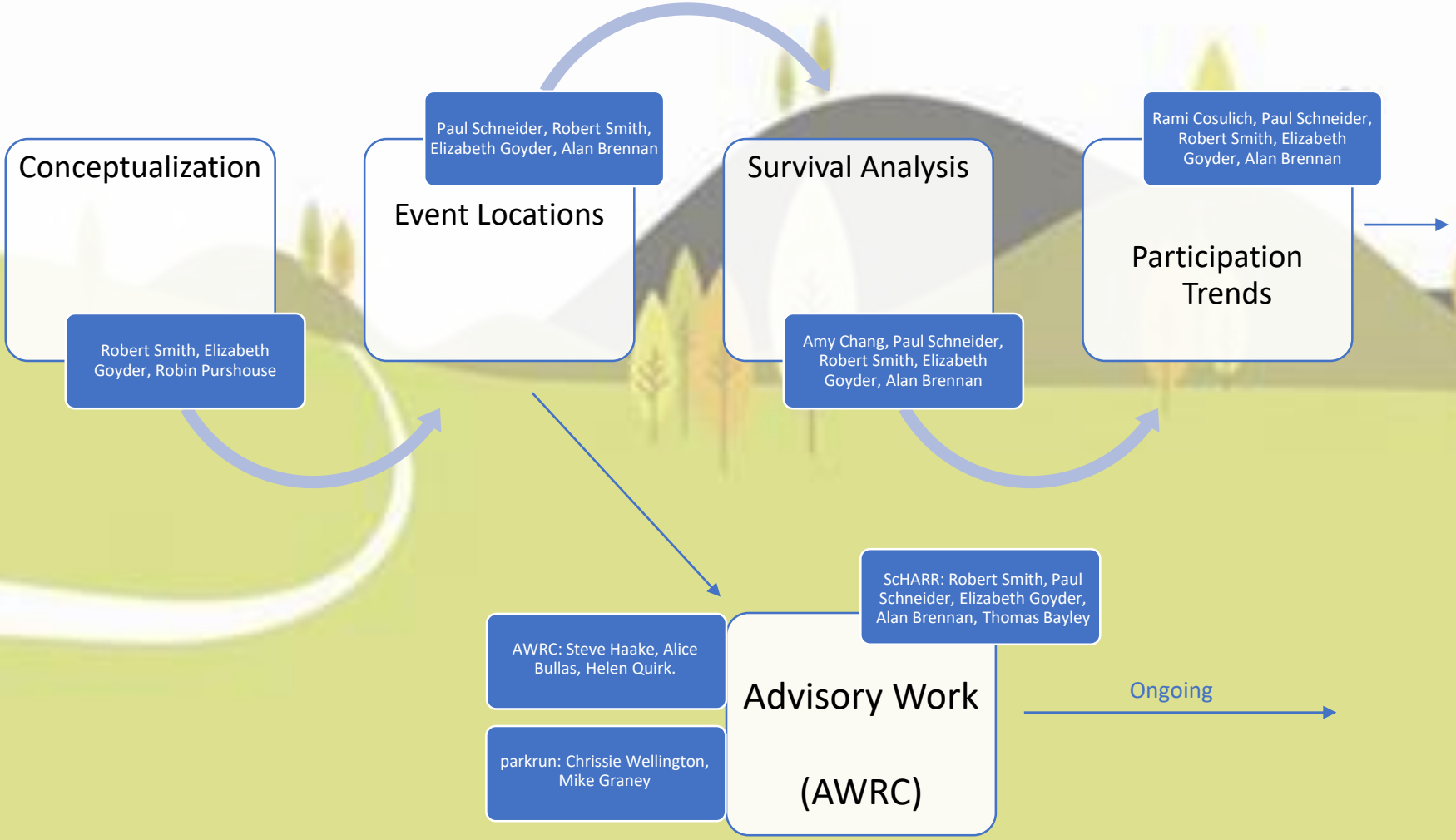
parkrun Research at ScHARR

Robert Smith
PhD Candidate,
Public Health Economics & Decision Science

02/10/2004

Parkrun research attachments



Conceptualization

Who: Robert Smith, Robin Purshouse & Elizabeth Goyder

When: Autumn 2016

Duration: 9 weeks

Outcomes:

- Understanding the problem
- Obtaining data
- Building networks

Event Locations

Who: Paul Schneider, Robert Smith, Elizabeth Goyder, Alan Brennan

When: Autumn 2018

Duration: 9 weeks

Outcomes:

- DoPE
- IOL map
- Team building

Survival Analysis

Who: Amy Chang, Paul Schneider, Robert Smith, Elizabeth Goyder, Alan Brennan

When: Winter 2019

Duration: 10 weeks

Outcomes:

- Better understanding of retention (Survival Curves)
- Engagement with Steve Haake & Chrissie Wellington
- Continuation of IOL & DoPE.

Participation Trends

Who: Rami Cosulich, Paul Schneider, Robert Smith, Elizabeth Goyder, Alan Brennan

When: Spring 2020

Duration: 10 weeks

Outcomes:

- DoPE Temporal
- Engagement with Steve Haake & Chrissie Wellington
- Continuation of IOL & DoPE.

Research Outputs

Outputs - Publications

- Schneider, P.P., Smith, R.A., Bullas, A.M., Bayley, T., Haake, S.S., Brennan, A. and Goyder, E., 2019. Where should new parkrun events be located? modelling the potential impact of 200 new events on socio-economic inequalities in access and participation. *MedRxiv*, p.19004143.
- Schneider, P.P., Smith, R., Bullas, A., Haake, S., Brennan, A. and Goyder, E., 2019. Who has access and who participates in parkrun?-implications for selecting future event locations. *European Journal of Public Health*, *29*(Supplement_4), pp.ckz186-432.
- Smith, Robert, Paul Schneider, Alice Bullas, Steve Haake, Helen Quirk, Rami Cosulich, and Elizabeth Goyder. "Does ethnic density influence community participation in mass participation physical activity events? The case of parkrun in England." *Wellcome Open Research* 5 (2020).
- Multiple deprivation and geographic distance to community sport events — achieving equitable access to parkrun in England. (Submitted to Public Health)

Does ethnic density influence community participation in mass participation physical activity events? The case of parkrun in England

Home » Browse » Does ethnic density influence community participation in mass participation...

Check for updates

RESEARCH ARTICLE

REVISED **Does ethnic density influence community participation in mass participation physical activity events? The case of parkrun in England [version 2; peer review: 3 approved]**

Robert Smith [1], Paul Schneider [1], Alice Bullas [2], Steve Haake [2], Helen Quirk [2], Rami Cosulich[1], Elizabeth Goyder [1]

Author details

ALL METRICS

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Abstract

Background: parkrun has been successful in encouraging people in England to participate in their weekly 5km running and walking events. However, there is substantial heterogeneity in parkrun participation across different communities in England: after controlling for travel distances, deprived communities have significantly lower participation rates.

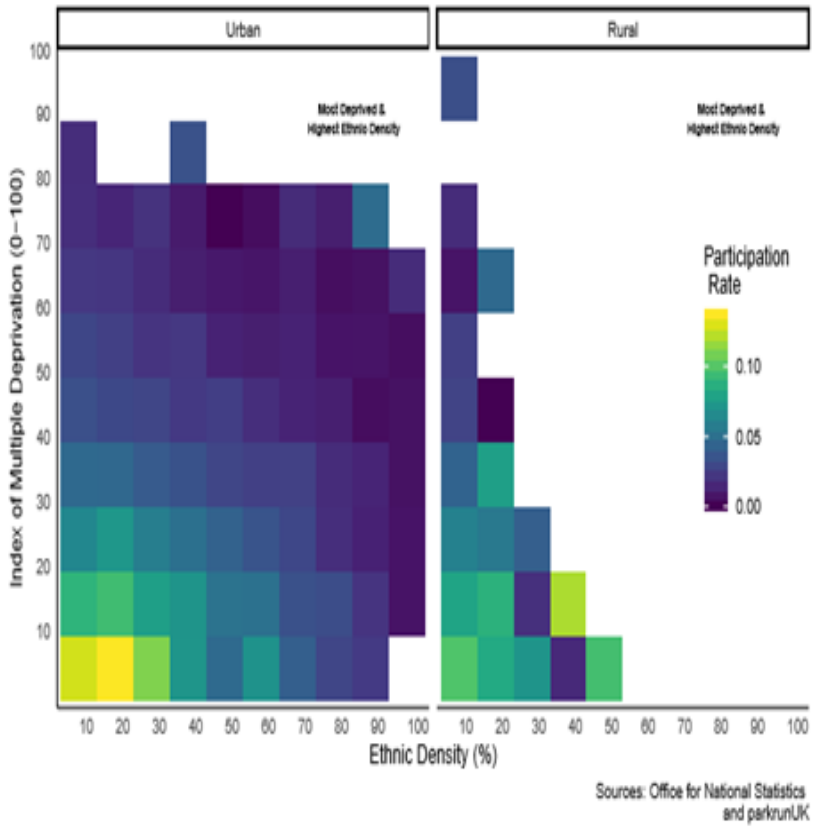
Methods: This paper expands on previous findings by investigating disparities in parkrun participation by ethnic density. We combined geo-spatial data available through the Office for National Statistics with participation data provided by parkrun, and fitted multivariable Poisson regression models to study the effect of ethnic density on participation rates at the Lower layer Super Output Level.

Results: We find that areas with higher ethnic density have lower participation rates. This effect is independent of deprivation.

Conclusions: An opportunity exists for parkrun to engage with these communities and reduce potential barriers to participation.

Keywords

parkrun, Physical Activity, Ethnic Density, Deprivation



https://github.com/ScHARR-PHEDS/DoPE_Public

Optimal Locations for 200 new parkrun events

PARTNERSHIP WITH PARKRUN WORTH £3M

Collaboration aims to create 200 new events and boost participants from under-represented groups

12 December 2018 News Funding

Where should new parkrun events be located? Modelling the potential impact of 200 new events on geographical and socioeconomic inequalities in access and participation.

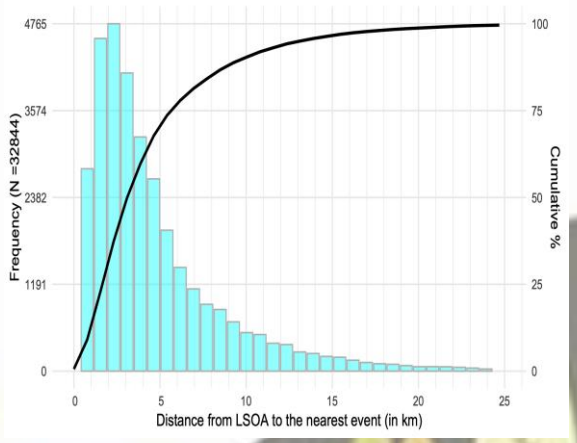
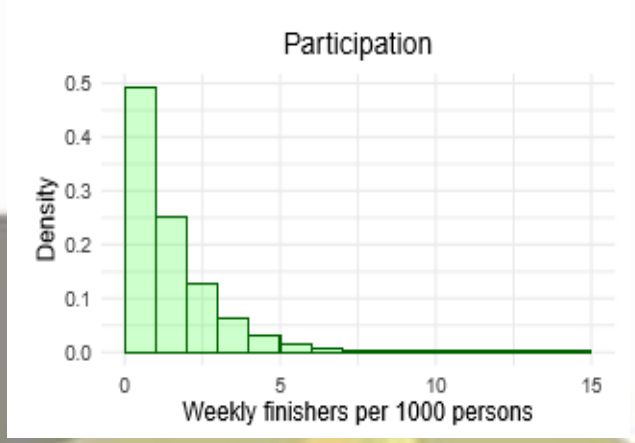
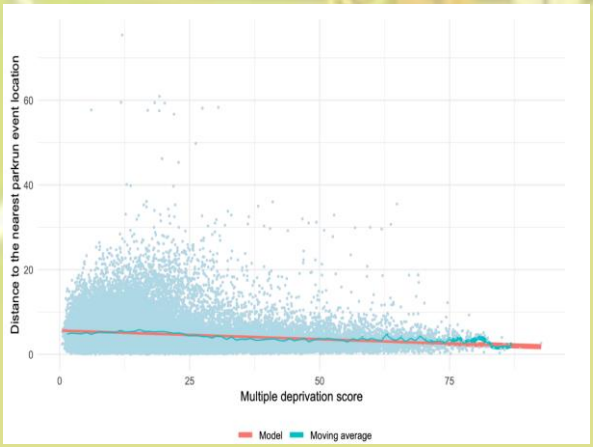
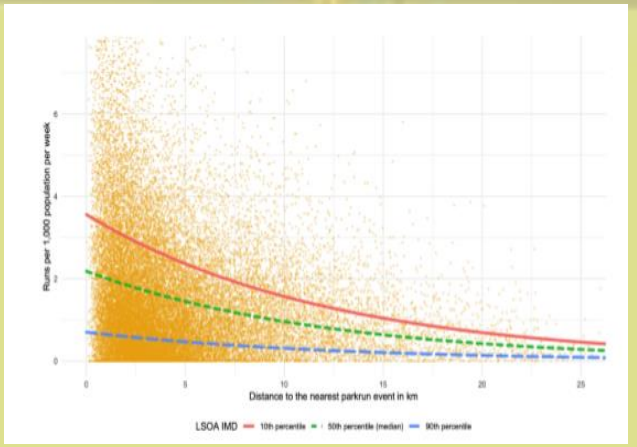
Schneider PP[1,*], Smith RA[1], Bullas AM[2], Bayley T[1], Haake SSJ[2], Brennan A[1], Goyder E[1]

[1] *School of Health and Related Research, University of Sheffield, Sheffield, UK.*
[2] *Advanced Wellbeing Research Centre, Sheffield Hallam University, Sheffield, UK.*

Abstract

Background
parkrun, an international movement which organises free weekly 5km running events, has been widely praised for encouraging inactive individuals to participate in physical activity. Recently, parkrun received funding to establish 200 new events across England, specifically targeted at deprived communities. This study aims to investigate the relationships between geographic access, deprivation, and participation in parkrun, and to inform the planned expansion by proposing future event locations.

Methods
We conducted an ecological spatial analysis, using data on 455 parkrun events, 2,842 public green spaces, and 32,844 English census areas. Poisson regression was applied to investigate the relationships between the distances to events, deprivation, and parkrun participation rates. Model estimates

	Access	Participation
Efficiency		
Equity		

Methods

More formally, we define that for any candidate green space location j, the objective function $f(j|E)$ provides the sum of parkrun runs r_i over all LSOA i, weighted by the squared IMD score w_i^2, given the set of established parkrun event locations $E = \{e_1, e_2, ..., e_{455}\}$:

$$f(j|E) = \sum_{i=1}^{32844} w_i^2 * r_{ij}$$

In the absence of causal estimates, we use the Poisson regression model specified above to predict the expected number of runs r_{ij} for LSOA i based on its IMD score w_i, its (linear) distance to the nearest parkrun event d_{ij}, and its population p_i. The functional form is given below.

$$E(r_{ij}|w_i, d_{ij}, p_i) = \exp\left(\beta_0 + \beta_1 * w_i + \beta_2 * d_{ij} + \ln(p_i) + \in\right)$$

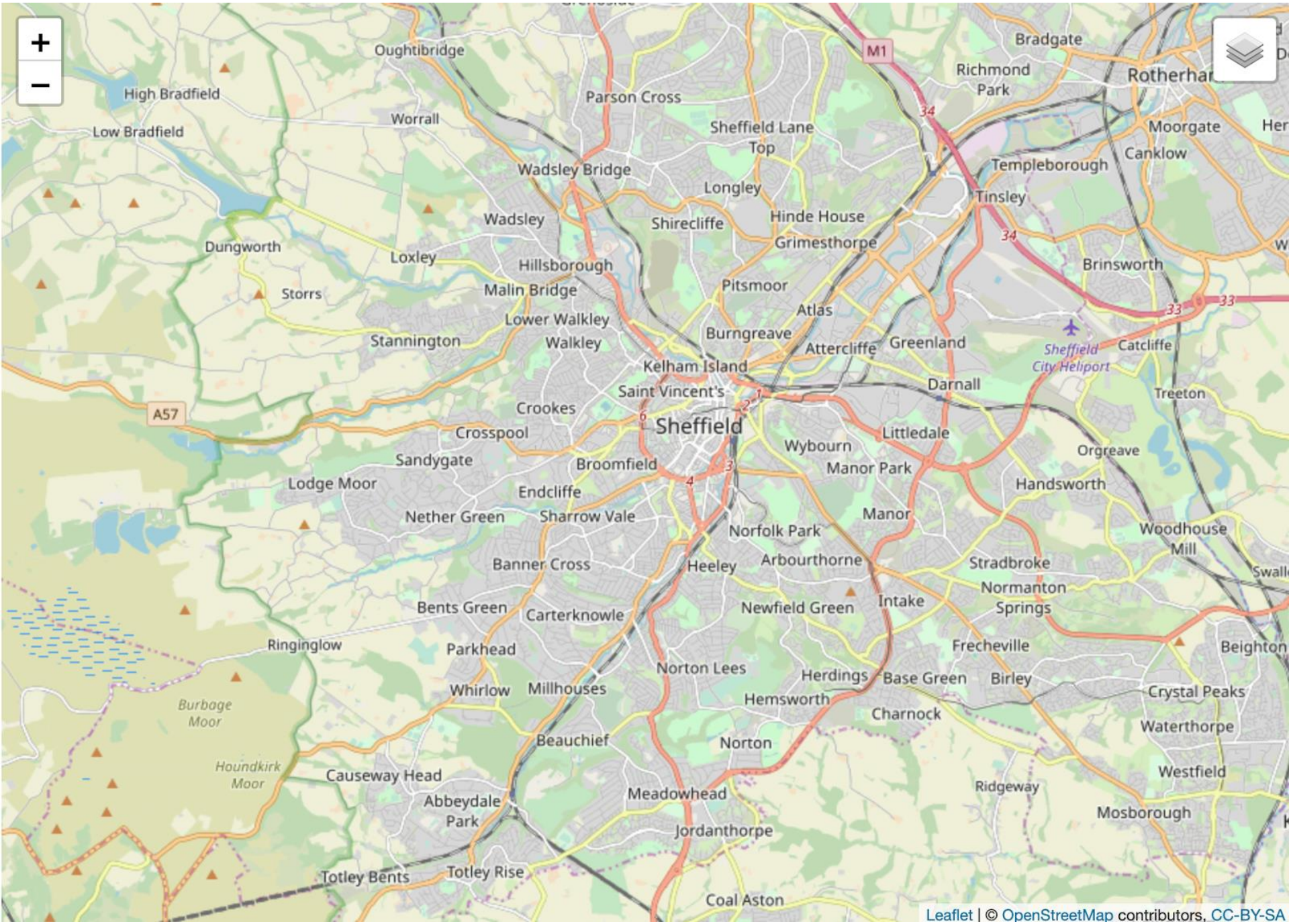
Filling-in the parameter coefficients (see table 3), we derive the following formula:

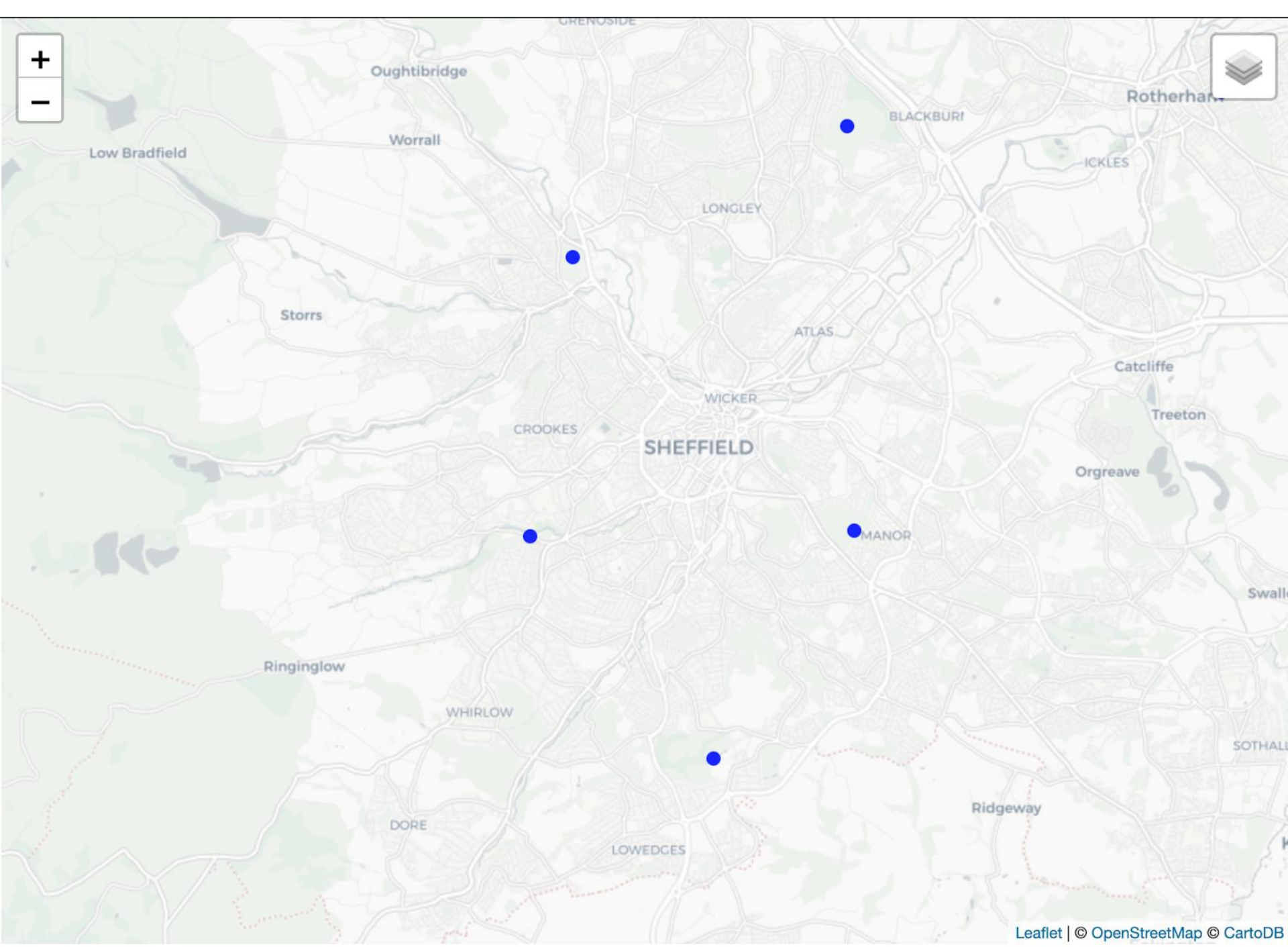
$$\hat{r_{ij}} = \exp\left(-5.402 - 0.048 * w_i - 0.082 * d_{ij} + \ln(p_i)\right)$$

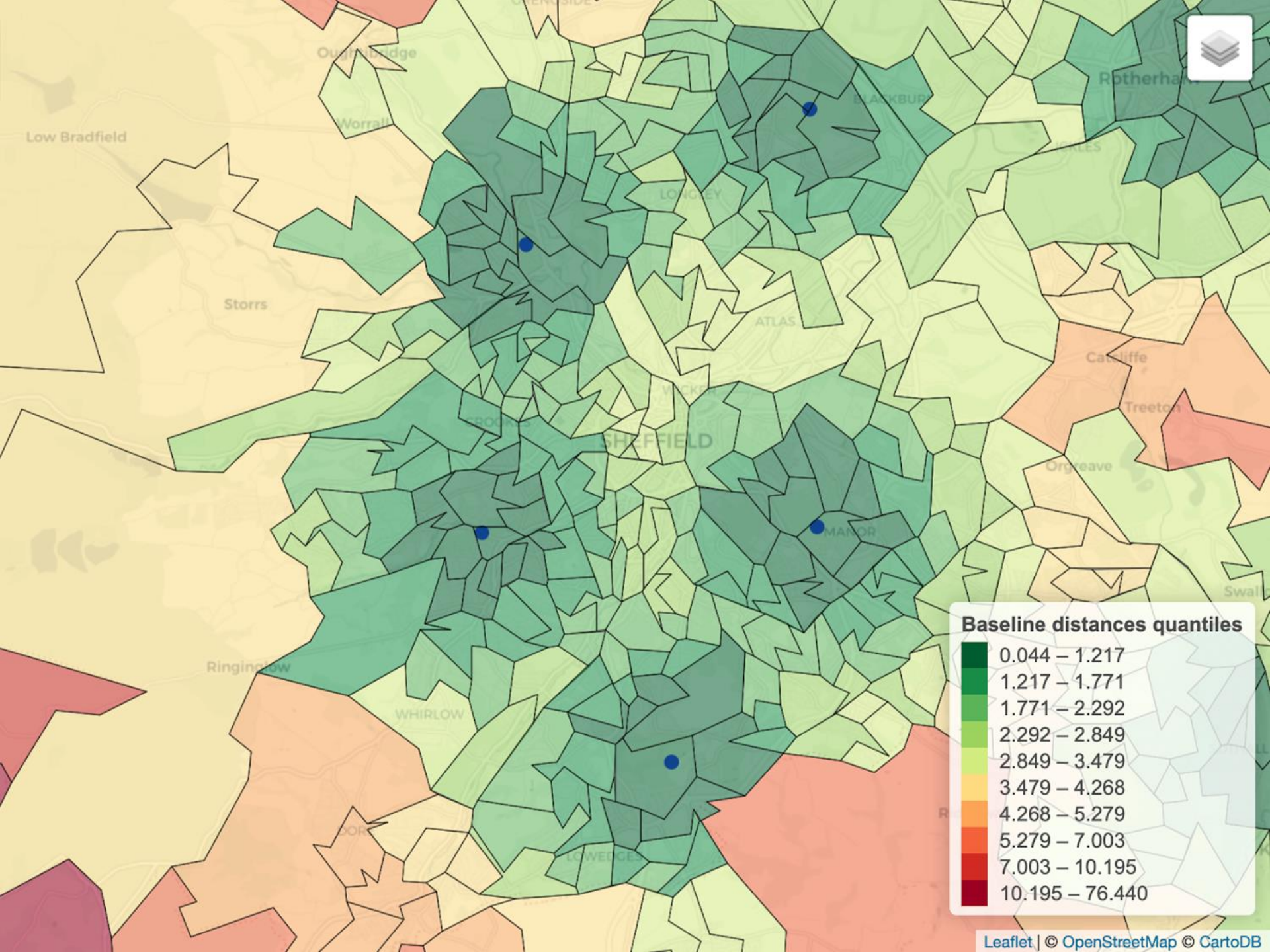
Note that j can have an effect on r_{ij} through d_{ij}: setting up a new event at location j will reduce the distance to the nearest event for some LSOA i. This means, we evaluate the distances from LSOA is location l_i to all established parkrun event locations $\{e_1, e_2, ..., e_{455}\} \in E$, denoted $\overline{l_i e_1}, \overline{l_i e_2}, \ldots, \overline{l_i e_{455}}$, and to the candidate green space location j, denoted $\overline{l_i j}$, and then take the minimum value, i.e. $d_{ij} = \min(\overline{l_i j}, \overline{l_i e_1}, \overline{l_i e_2}, \ldots, \overline{l_i e_{455}})$.

The expected change in the objective function is computed for all candidate locations j in the set of the available green spaces $C = \{c_1, c_2, \ldots, c_{2842}\}$, and the location with the maximum value is selected. The selection function is expressed in the following formula:

$$\arg\max_{j \in C} f(j|E)$$


Oughtibridge
High Bradfield
Low Bradfield
Worrall
Parson Cross
Sheffield Lane Top
Wadsley Bridge
Longley
Wadsley
Shirecliffe
Hinde House
Grimesthorpe
Dungworth
Loxley
Hillsborough
Malin Bridge
Pitsmoor
Storrs
Lower Walkley
Walkley
Stannington
Burngreave
Attercliffe
Greenland
Kelham Island
Saint Vincent's
Crookes
Sheffield
Crosspool
Sandygate
Broomfield
Lodge Moor
Endcliffe
Nether Green
Sharrow Vale
Norfolk Park
Banner Cross
Heeley
Arbourthorne
Bents Green
Carterknowle
Newfield Green
Ringinglow
Parkhead
Norton Lees
Whirlow
Millhouses
Hemsworth
Burbage Moor
Houndkirk Moor
Beauchief
Norton
Causeway Head
Abbeydale Park
Meadowhead
Jordanthorpe
Totley Bents
Totley Rise
Coal Aston
Bradgate
Richmond Park
Moorgate
Canklow
Templeborough
Tinsley
Brinsworth
Atlas
Sheffield City Heliport
Catcliffe
Darnall
Treeton
Wybourn
Littledale
Orgreave
Manor Park
Handsworth
Manor
Woodhouse Mill
Stradbroke
Normanton Springs
Intake
Frecheville
Herdings
Base Green
Birley
Crystal Peaks
Charnock
Waterthorpe
Westfield
Ridgeway
Mosborough
M1
A57
Leaflet | © OpenStreetMap contributors, CC-BY-SA


Oughtibridge
Worrall
Low Bradfield
Storrs
LONGLEY
BLACKBURN
ICKLES
ATLAS
WICKER
CROOKES
SHEFFIELD
Catcliffe
Treeton
Orgreave
MANOR
Ringinglow
WHIRLOW
DORE
LOWEDGES
Ridgeway
Leaflet | © OpenStreetMap © CartoDB


Baseline distances quantiles
0.044 – 1.217
1.217 – 1.771
1.771 – 2.292
2.292 – 2.849
2.849 – 3.479
3.479 – 4.268
4.268 – 5.279
5.279 – 7.003
7.003 – 10.195
10.195 – 76.440
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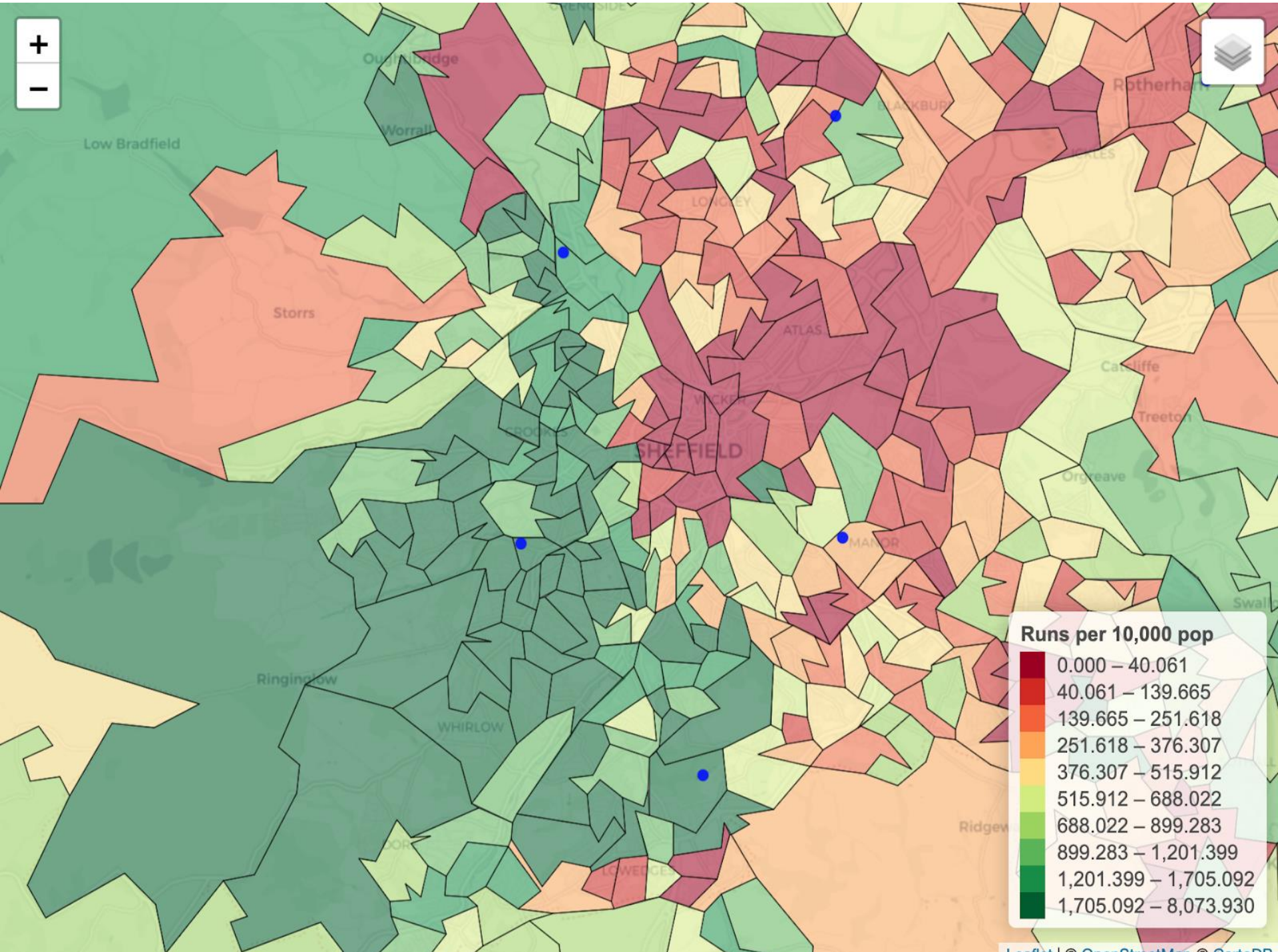
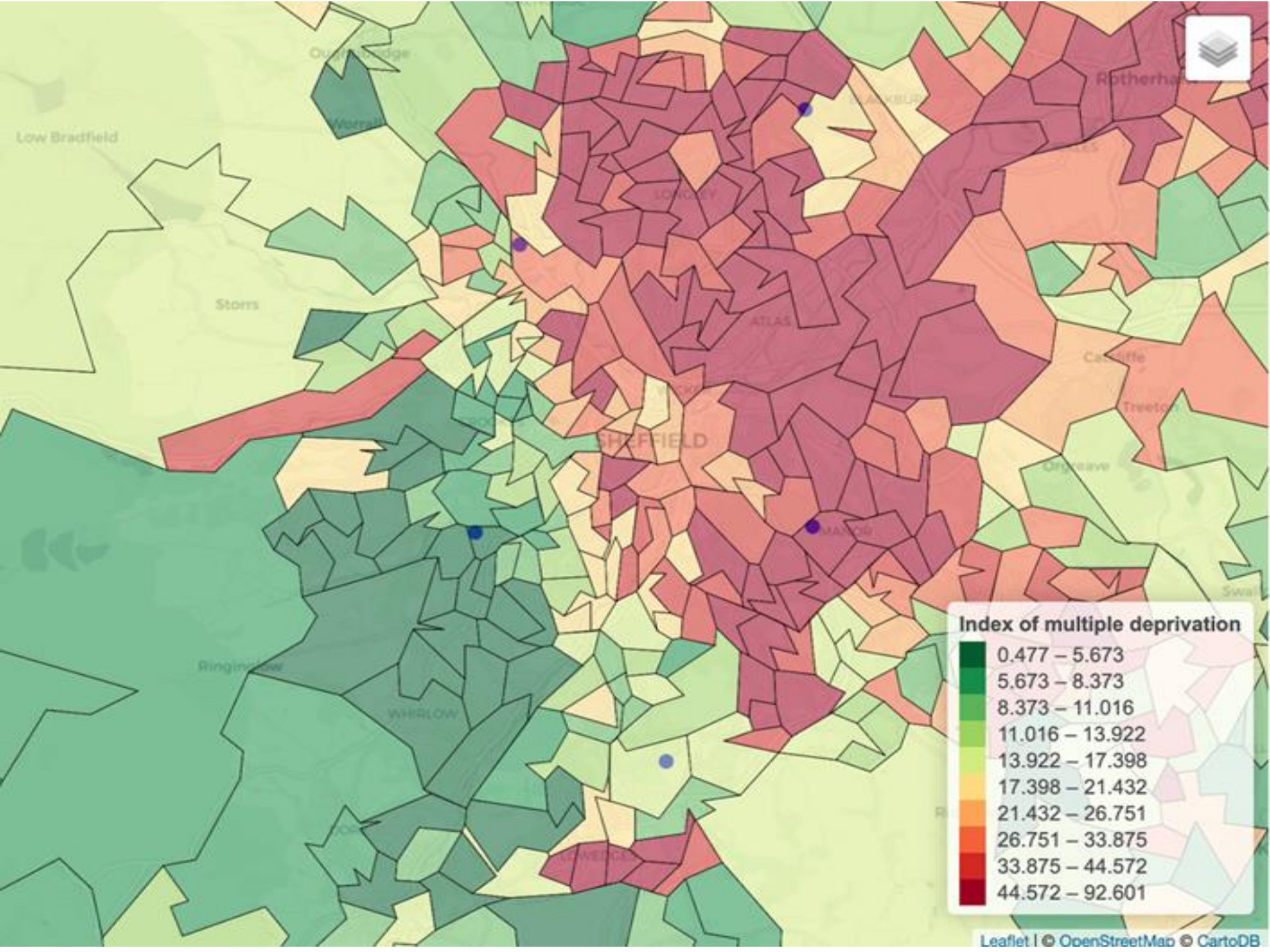

Runs per 10,000 pop
0.000 – 40.061
40.061 – 139.665
139.665 – 251.618
251.618 – 376.307
376.307 – 515.912
515.912 – 688.022
688.022 – 899.283
899.283 – 1,201.399
1,201.399 – 1,705.092
1,705.092 – 8,073.930
Low Bradfield
Storrs
Ringinglow
WHIRLOW
SHEFFIELD
Rotherham
Treeton
Orgreave
Catcliffe


Index of multiple deprivation
0.477 – 5.673
5.673 – 8.373
8.373 – 11.016
11.016 – 13.922
13.922 – 17.398
17.398 – 21.432
21.432 – 26.751
26.751 – 33.875
33.875 – 44.572
44.572 – 92.601
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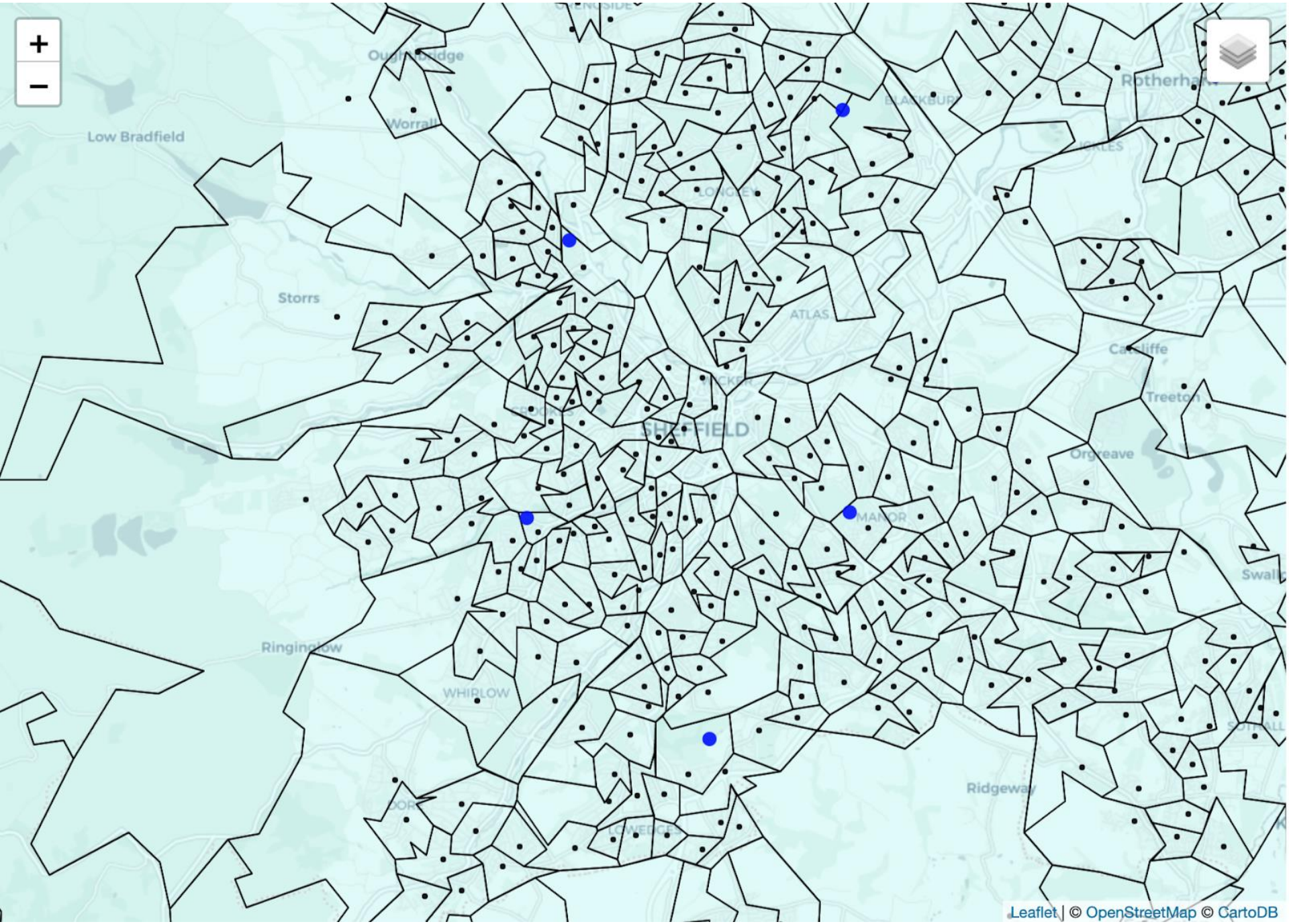
Low Bradfield
Storrs
Ringinglow
WHIRLOW
Ridgeway
Treeton
Orgreave
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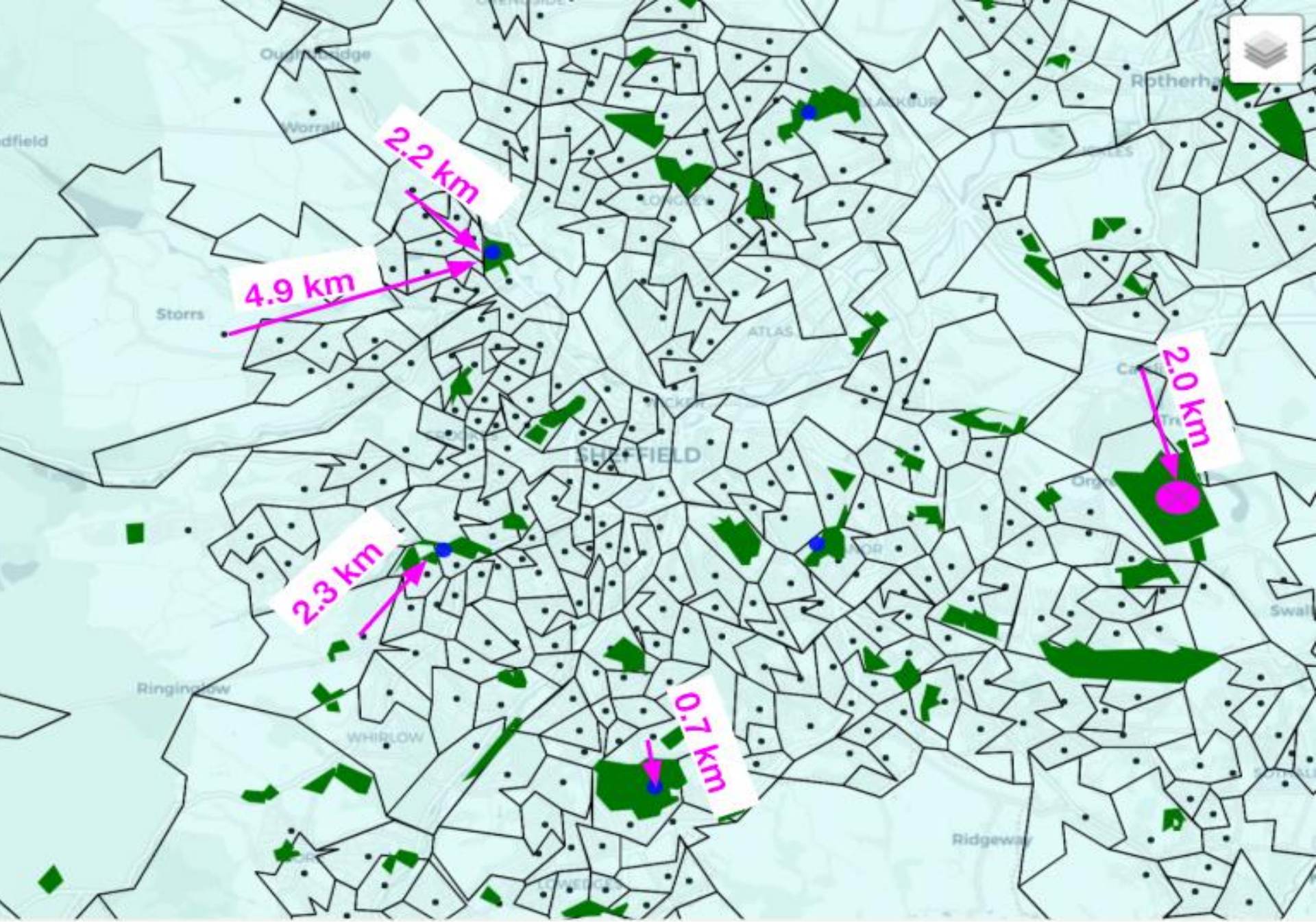
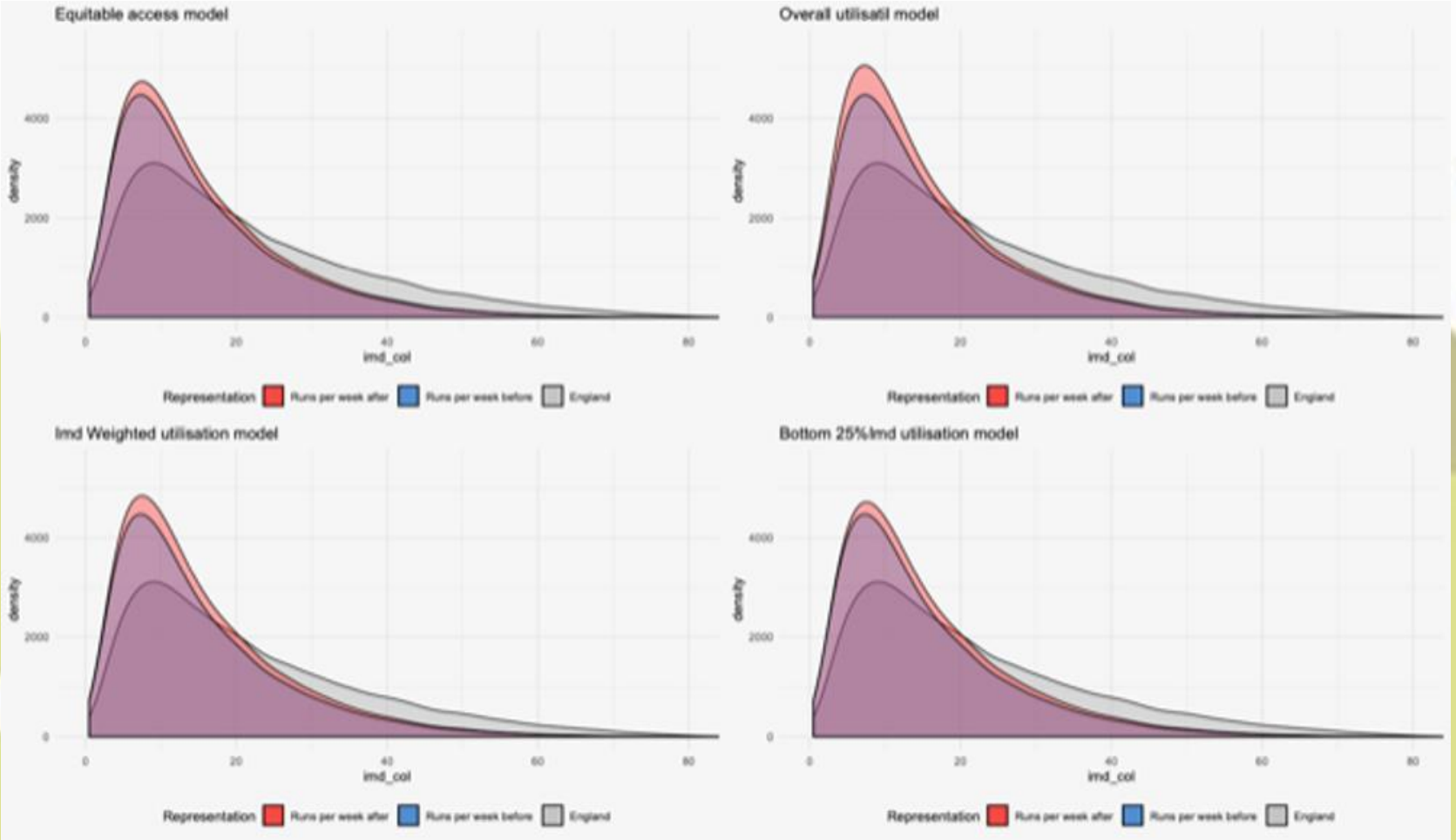
Access = { 2.2 * 1,220 + 4.9 * 2,351+ 2.3*1,915 + 0.7 * 1,844 + 5.1 * 1,530 } = <u>27,702.2</u>

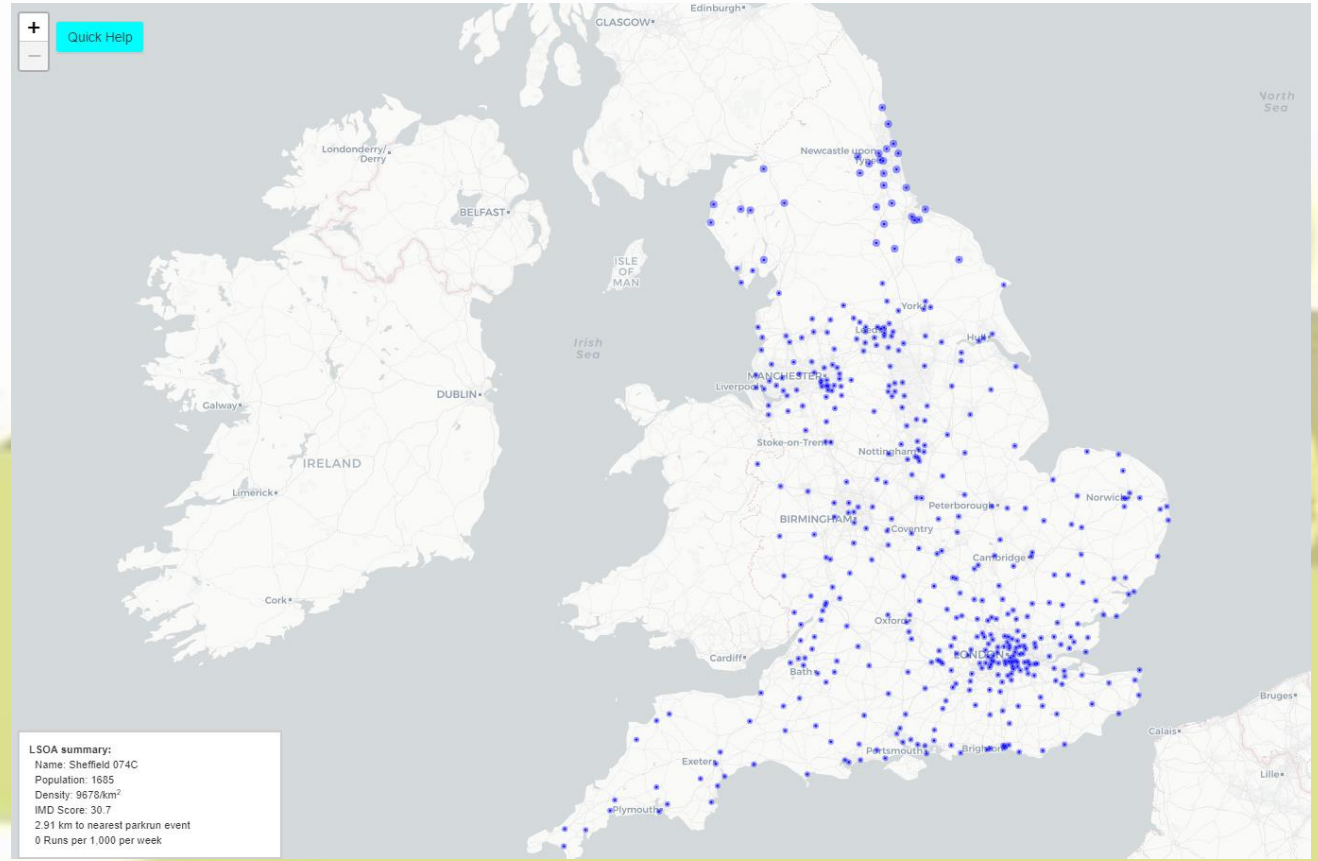


Access = { 2.2 * 1,220 + 4.9 * 2,351+ 2.3*1,915 + 0.7 * 1,844 + 2.0 * 1,530 } = 22,959.2

Depressing slide ….



Identifying Optimal Locations Map



http://iol-map.shef.ac.uk/

European Journal of Public Health, 29

Access to and participation in parkrun events in England – Analysis and policy recommendations for the next 200 events.

Paul Schneider[1], Robert Smith[1], Alice Bullas[2], Thomas Bayley[1], Steve Haake[2], Alan Brennan[1], Elizabeth Goyder[1]

[1]ScHARR, University of Sheffield, Sheffield, UK
[2]AWRC, Sheffield Hallam University, Sheffield, UK

Background

parkrun hosts free, weekly 5 km running events in public green spaces across England.

The events have been widely praised for being inclusive and for encouraging previously physically inactive people to participate.

Recently, parkrun received funding to establish 200 new events across England – specifically targeted at deprived communities.

Objectives

1) To study the geographic and socioeconomic disparities in the access to and the participation in parkrun events
2) To identify future event locations to maximise participation from deprived communities

Methods

Setting: England, 2018, ecological spatial analysis

Data: 32,844 census areas 455 parkrun event locations, and 2,842 green spaces

Analysis: The effects of access and deprivation on participation rates at the level of census areas was studied using Poisson regression

Optimal Locations: Model estimates were incorporated into a greedy location-allocation analysis to identify 200 optimal green spaces for setting up new parkrun events

Maximand: $\sum participation * deprivation^2$

Every week, about 83,000 people attend parkrun's 5k running events in England.

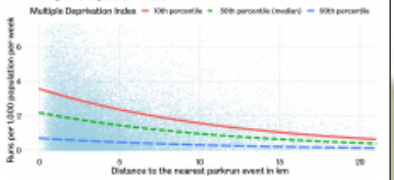
Participants mostly come from affluent areas – despite equal access, participation from deprived areas are markedly lower.

We make recommendations for 200 future parkrun event locations, to maximise deprivation-weighted participation.

Our findings show, the creation of new events alone is unlikely to be an effective strategy and might even worsen inequalities.

Results

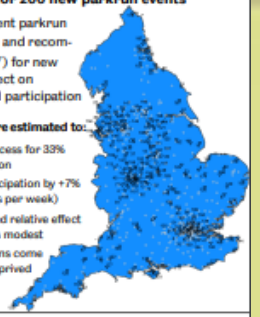
- The median distance between the 32,844 census areas and the nearest parkrun was 3.5 km (IQR=2.0–6.0 km)
- Median participation was 1.1 / 1,000 pop. (IQR=0.4–2.2)
- Distance and deprivation were strong predictors of participation rates (see figure below):
  - An increase in distance by 1km was associated with a 7.9% lower parkrun participation rate
  - A one-unit increase in the deprivation score (range 1-80) was associated with a 6.1% lower participation rate



Relationship between distance to nearest parkrun event and participation. Points show the observed rates for census areas (n=32,844). Lines show estimates for different deprivation levels (least, median, most deprived).

Optimal locations for 200 new parkrun events

The map shows current parkrun events (○) in England and recommended locations (▽) for new events, ranked by effect on deprivation-weighted participation



The 200 new events are estimated to:

- improve geographic access for 33% of the English population
- increase parkrun participation by +7% (= 5,682 additional runs per week)
- However, the estimated relative effect on deprived areas was modest
- Only 4% of the new runs come from the 10% most deprived areas

Paul Peter Schneider
School of Health and Related Research
University of Sheffield, Sheffield, UK
p.schneider@sheffield.ac.uk
Twitter: @waq0r

Interactive Online map
Schneider PP, Smith RA, Bullas AM, Bayley T, Haake SSJ, Brennan A, Goyder E. Identifying optimal locations and maximising access to parkrun. Interactive online map. 2019. http://isl-map.shef.ac.uk/

Preprint
Schneider PP, Smith RA, Bullas AM, Bayley T, Haake SS, Brennan A, Goyder E. Where should new parkrun events be located? medRxiv. 2019. Preprint. https://doi.org/10.1101/19004143

The University Of Sheffield.

wellcome

Sheffield Hallam University

Outputs – Open Source

https://github.com/ScHARR-PHEDS/DoPE_Public

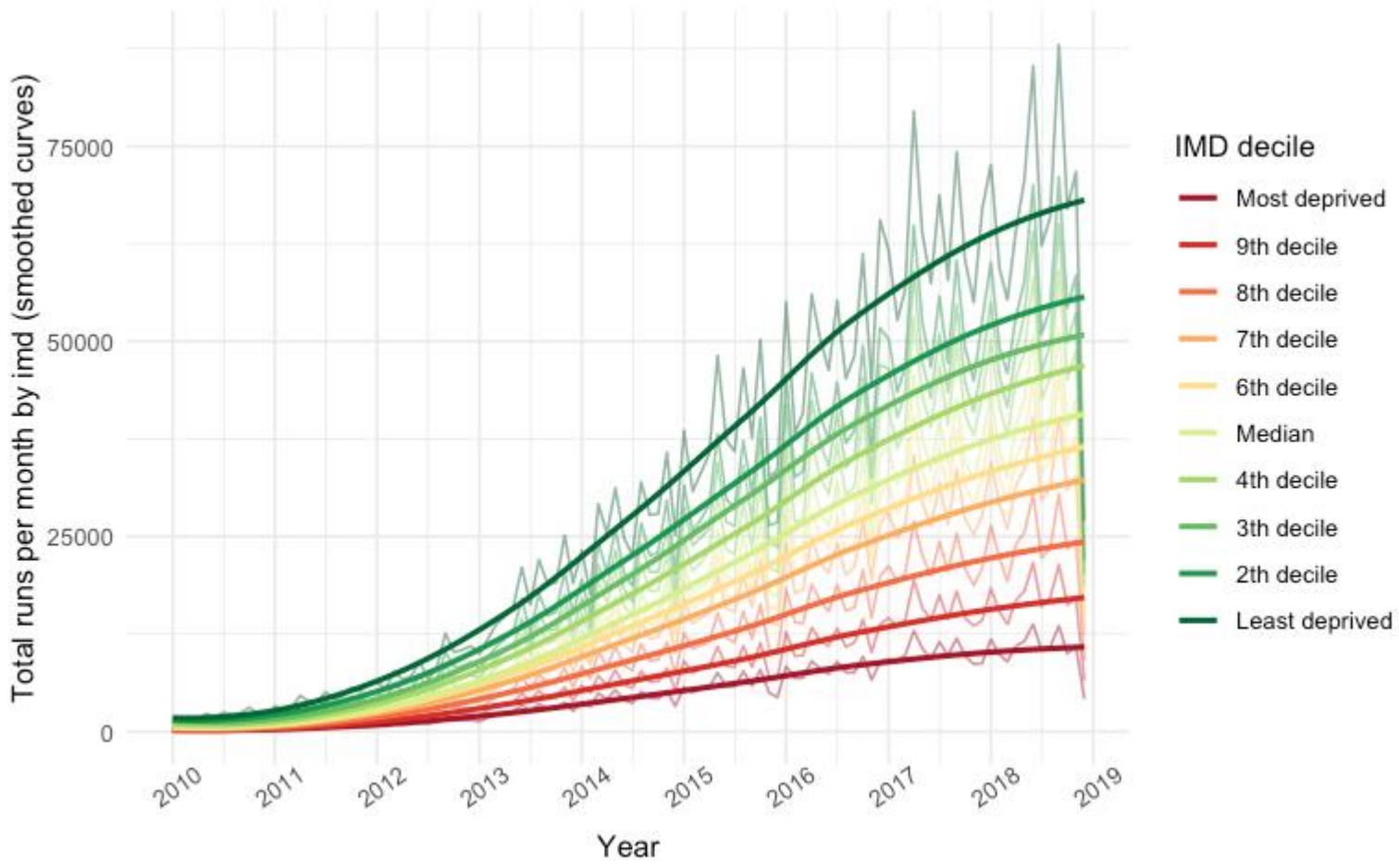
https://github.com/bitowaqr/iolmap_analysis

https://github.com/ScHARR-PHEDS/attachment3_parkrun

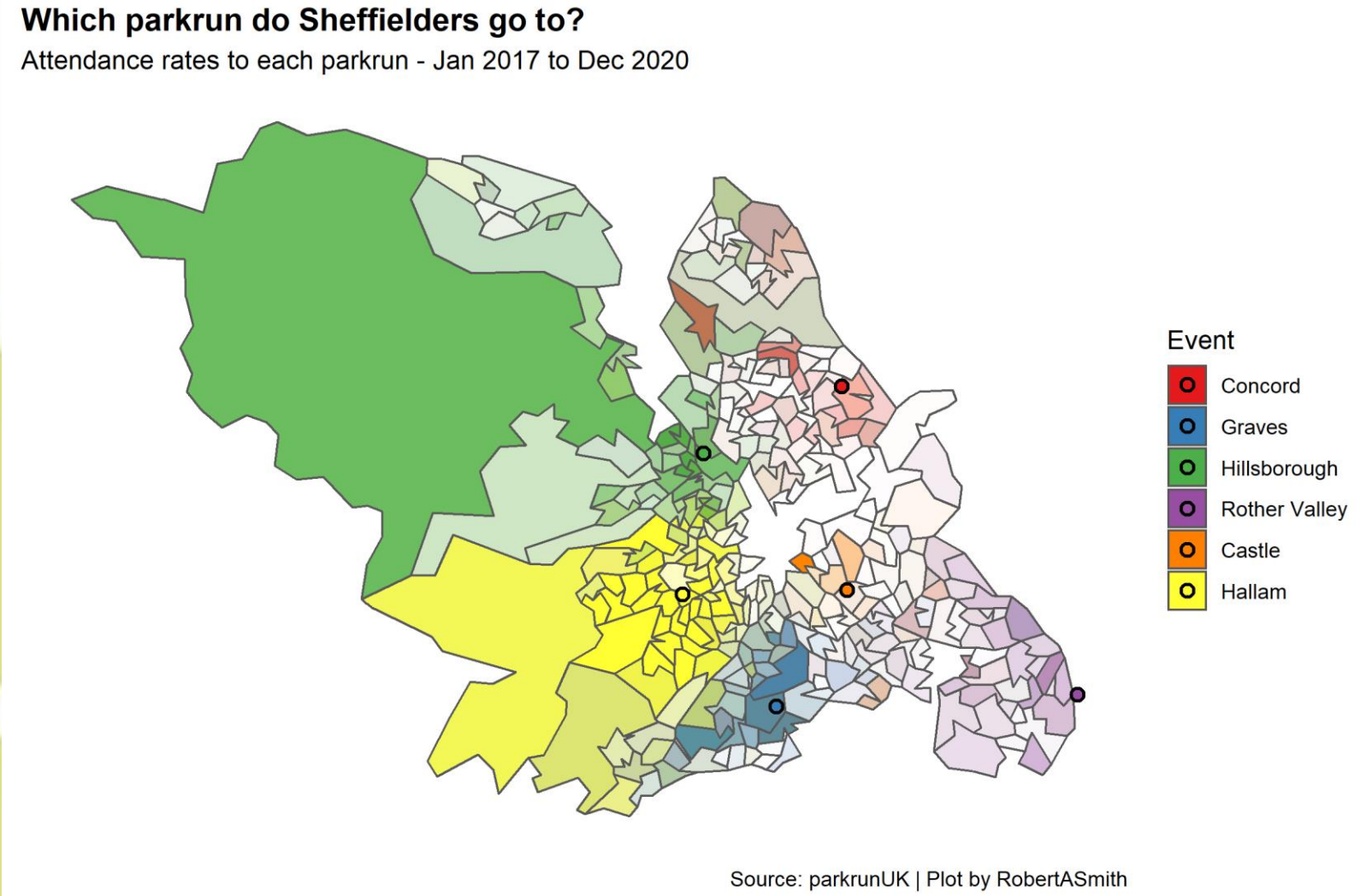
https://github.com/ScHARR-PHEDS/parkrun_book

Ongoing

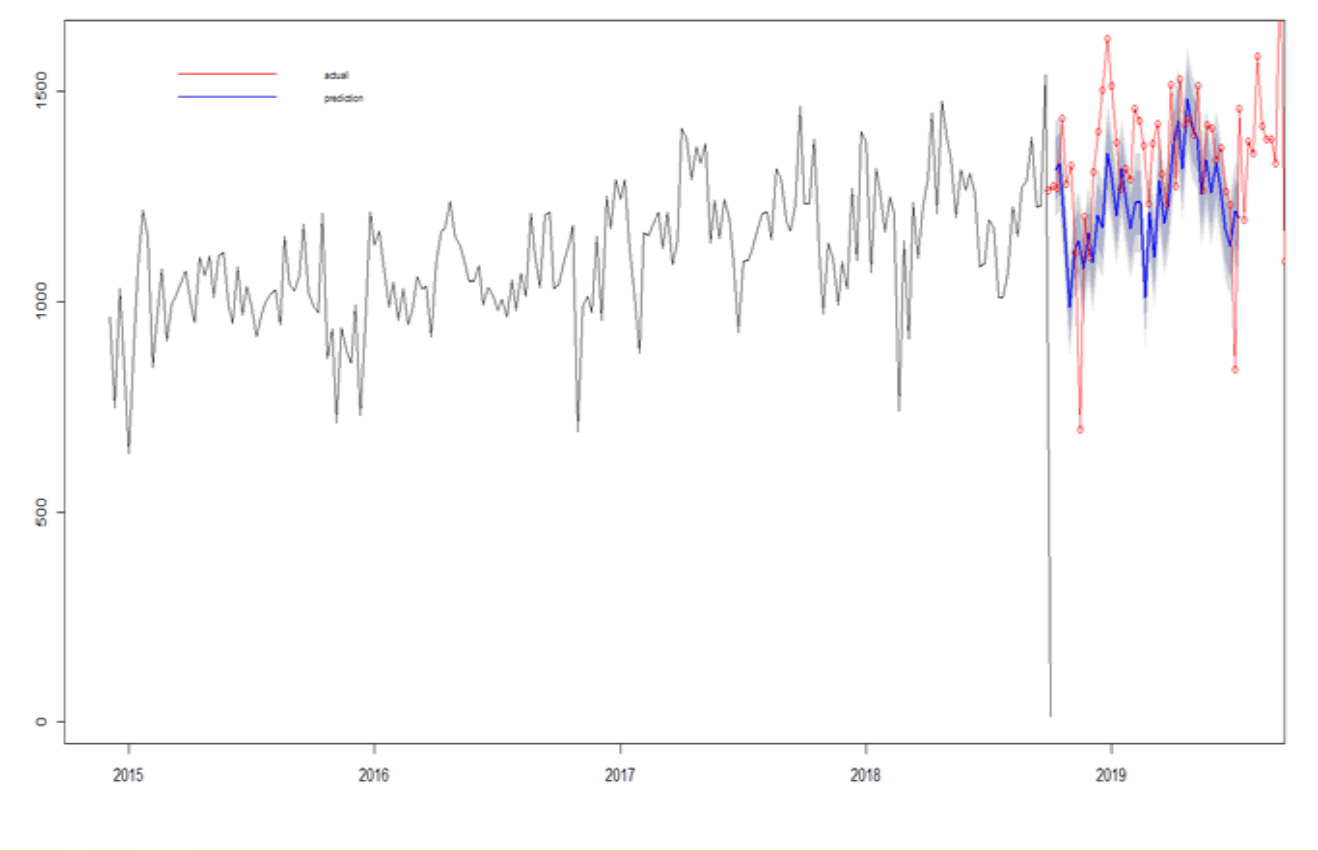
Trends in participation



Overperforming events

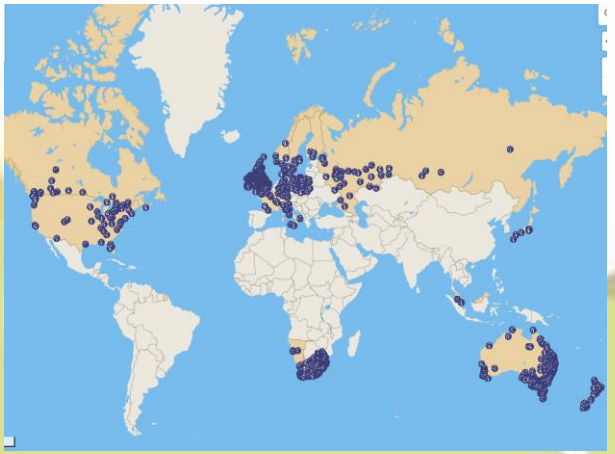


Weather data to predict attendance

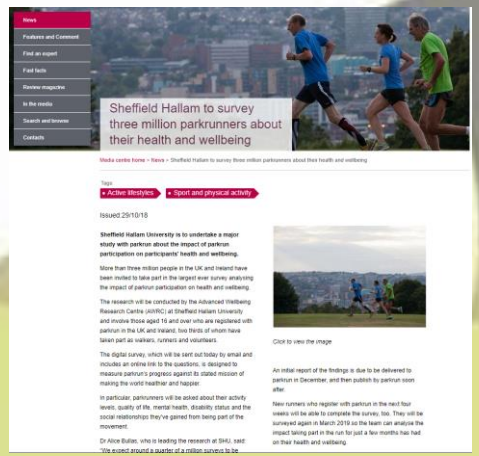


Further Research

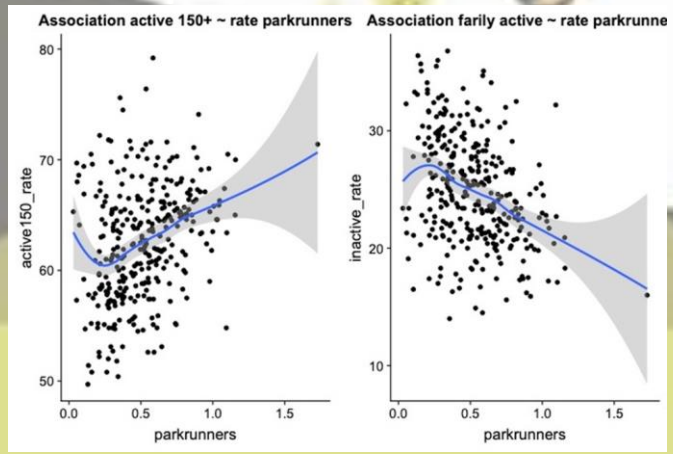
International Replication



Economic Model



Wider Impact



parkrun Research at ScHARR

Additional Slides

Acknowledgements

Co-authors on pre-print Access & Participation Paper (Attachment 1):

Schneider PP[1], Bullas A[2], Bayley T[1], Haake SSJ[2], Brennan A[1], Goyder E[1]

Collaborators on conditional probability project (Attachment 2):

Chang J, Schneider PP[1], Brennan A[1], Goyder E[1]

Collaborators on the determinants of participation paper:

Schneider PP[1], Bullas A[2], Haake SSJ[2], Brennan A[1], Goyder E[1]

With special thanks to team at Parkrun Global Wellbeing:

Chrissie Wellington OBE, Rowan Ardill, Tom Mason.

[1]School of Health and Related Research, University of Sheffield, Sheffield, UK.
[2]Advanced Wellbeing Research Centre, Sheffield Hallam University, Sheffield, UK.
[3]Parkrun Global Health and Wellbeing, ParkrunUK, London.

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Where should new parkrun events be located? Modelling the potential impact of 200 new events on geographical and socioeconomic inequalities in access and participation.

Schneider PP[1,*], Smith RA[1], Bullas AM[2], Bayley T[1], Haake SSJ[2], Brennan A[1], Goyder E[1]

[1]*School of Health and Related Research, University of Sheffield, Sheffield, UK.*
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Abstract

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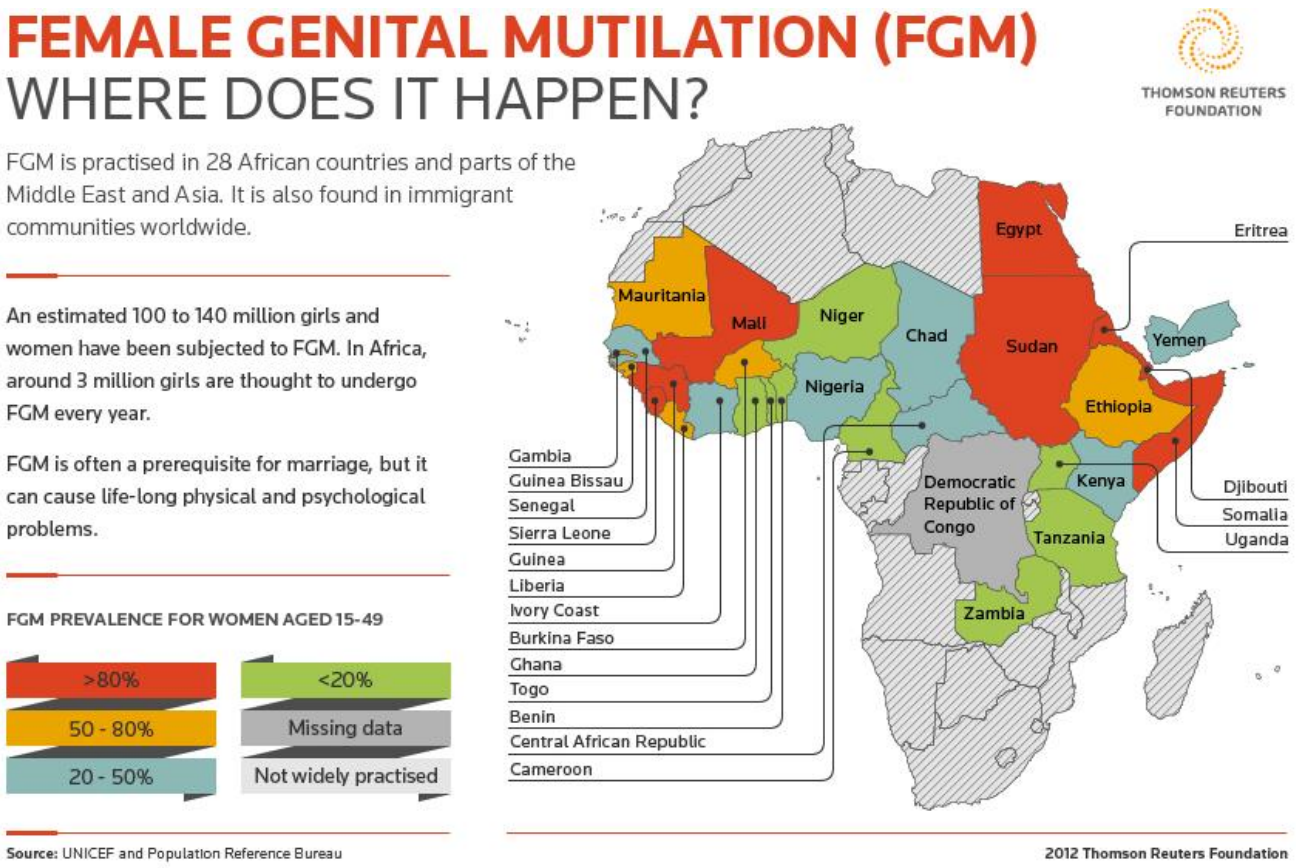
parkrun, an international movement which organises free weekly 5km running events, has been widely praised for encouraging inactive individuals to participate in physical activity. Recently, parkrun received funding to establish 200 new events across England, specifically targeted at deprived communities. This study aims to investigate the relationships between geographic access, deprivation, and participation in parkrun, and to inform the planned expansion by proposing future event locations.

Methods
We conducted an ecological spatial analysis, using data on 455 parkrun events, 2,842 public green spaces, and 32,844 English census areas. Poisson regression was applied to investigate the relationships between the distances to events, deprivation, and parkrun participation rates. Model estimates were incorporated into a location-allocation analysis, to identify locations for future events that maximise deprivation-weighted parkrun participation.

WHO - FGM Model



https://rasmith3.shinyapps.io/shiny_fgm_240120/

Trends at Bushy Parkrun